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March 21, 2000

BOX PCT

Assistant Commissioner for Patents
Washington, D.C. 20231

PCT/FR99/01797
-filed July 21, 1999

Re: Application of Jean-Pierre HAUET
COMMUNICATIONS ARCHITECTURE FOR AN INDUSTRIAL PROCESS CONTROL SYSTEM
Our Ref: Q58185

Dear Sir:

The following documents and fees are submitted herewith in connection with the above application for the purpose of entering the National stage under 35 U.S.C. § 371 and in accordance with Chapter I of the Patent Cooperation Treaty:

☑ an executed Declaration and Power of Attorney.

☑ an English translation of the International Application.

☑ 2 sheets of formal drawings.

☐ an English translation of Article 19 claim amendments.

☐ an English translation of Article 34 amendments (annexes to the IPER).

☑ an executed Assignment and PTO 1595 form.

☑ an Information Disclosure Statement with Form PTO-1449 listing the ISR references, and a complete copy of each reference.

☑ a Preliminary Amendment

The Government filing fee is calculated as follows:

Total claims	3	-	20	=		x	$18.00	= $.00
Independent claims	2	-	3	=		x	$78.00	= $.00
Base Fee								$840.00
TOTAL FILING FEE								$840.00
Recordation of Assignment								$ 40.00
TOTAL FEE								$880.00

Checks for the statutory filing fee of $840.00 and Assignment recordation fee of $40.00 are attached. You are also directed and authorized to charge or credit any difference or overpayment to said Account. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16, 1.17 and 1.492 which may be required during the entire pendency of the application to Deposit Account No. 19-4880. A duplicate copy of this transmittal letter is attached.

Priority is claimed from July 22, 1998 based on French Application No. 9809381.

Respectfully submitted,

David J. Cushing
Registration No. 28,703

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Date: March 21, 2000

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	PCT/FR99/01797
Jean-Pierre HAUET	Attorney Docket Q58185
Appln. No.:	Group Art Unit:
Filed: March 21, 2000	Examiner:

For: COMMUNICATIONS ARCHITECTURE FOR AN INDUSTRIAL PROCESS CONTROL SYSTEM

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 1, after the title, insert the heading --Background of the Invention--.

Page 3, after line 2, insert the heading --Summary of the Invention--.

Page 4, after line 11, insert the heading --Brief Description of the Drawing--.

after line 23, insert the heading --Detailed Description of the Invention--.

IN THE ABSTRACT:

After the heading "Abstract" delete the title.

REMARKS

Entry and consideration of this Amendment is respectfully requested.

Respectfully submitted,

David J. Cushing
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Jean-Pierre HAUET

Serial No: PCT/FR 99/01797

Filed: JULY 21, 1999

For: COMMUNICATIONS ARCHITECTURE FOR AN INDUSTRIAL PROCESS CONTROL SYSTEM

DECLARATION

I, Andrew Scott Marland, of 35, avenue Chevreul, 92270 BOIS COLOMBES, France, declare that I am well acquainted with the English and French languages and that the attached translation of the French language PCT international application, Serial No. **PCT/FR99/01797** is a true and faithful translation of that document.

All statements made herein are to my own knowledge true, and all statements made on information and belief are believed to be true; and further, these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any document or any registration resulting therefrom.

Date: February 29, 2000

Andrew Scott Marland

COMMUNICATIONS ARCHITECTURE FOR AN INDUSTRIAL PROCESS CONTROL SYSTEM

The invention relates to information communications architecture designed more particularly to be installed in an industrial process control system so as to enable digitized information to be transmitted in time shared manner between programmed operating units of the system.

As is known, managing an industrial process control system involves the presence of communications architecture in order to transmit information between the various programmed operating units that can act in the control of the process, so that the information is transmitted in a manner well suited to the various needs encountered. Such an architecture is commonly made up of one or more "industrial" local area networks organized around one or more bus-type links.

It is conventional in such systems to use the links in time shared manner for transmitting information between the programmed operating units. It is common in the field of industrial process control to have very strict transmission constraints for certain information. That involves implementing "deterministic" local area networks which are organized to make it possible to comply with the time constraints for transmitting information for which such constraints are necessary, i.e. which convey information within a determined time limit, or which aim to achieve such a result.

It is then known to enable information whose transmission is subject only to relatively flexible constraints in terms of urgency to make use of the lapses of time that are left available on a more or less regular basis by the priority information which is subject to constraints that are more severe.

In many operating cases, it is advantageous to be able to access, at will and without there necessarily being any urgency, information contained in a memory of any one of the programmed operating units of a system,

e.g. by means of another programmed unit or of a computer, via the communications architecture of the system, and regardless of the location of said other unit or of said computer relative to the system.

In particular, when the operation of a system involves a wide variety of equipment involving various users taking action that is not necessarily plannable, it is advantageous for those users to be able to access easily the information that they need, via the communications architecture of the system, and optionally from the outside, whenever such information is stored accessibly by a programmed operating unit of the system.

Such access must preferably be possible for users who can differ widely. One known system thus makes provision to use a communications architecture that uses an information access technique that is implemented more particularly in the context of the Internet.

For that purpose, the information that is available in the programmed operating units and in particular the information that has been collected via the communications architecture of the system, is inserted into HTML pages installed in a programmed operating unit of the system that is constituted by a dedicated computer in which an HTTP server is installed. That computer is, for example, connected to an external network 0 which uses the Internet techniques, or even to the Internet itself. Any user who has access to a suitably-equipped computer assumed, in that example, to be connected to the network 0, or who has access to a functionally-equivalent programmed unit of the system, can then become acquainted with the information contained in the HTML pages, stored in the dedicated computer.

However, that solution is not entirely satisfactory in particular as regards how up-to-date the stored information is. Unfortunately, that can be crucial in a system in which certain items of equipment and in

particular certain site units are used in real time and must not be disturbed during the control of the process.

The invention therefore provides a time-shared communications architecture for communicating digitized information for an industrial process control system, which architecture is organized around at least one industrial local area network conveying deterministic traffic between various programmed operating units, which units process and store information which can be accessed by at least one other programmed operating unit via said architecture.

According to a characteristic of the invention, said architecture includes various programmed operating units in particular comprising units situated at an intermediate level or at a process interface level or at a site monitoring/control device level, which units individually include servers of the HTTP type so as to be capable of sending optionally interactive computer documents in response to requests received from another unit of the system or from a computer, in particular external to the system, equipped with an HTTP/TCP/IP protocol stack and acting as a customer, in the context of messaging traffic making use of the transmission possibilities constituted by the time slots left available by the deterministic traffic of the industrial local area network(s) of the system, without disturbing the priority and deterministic interchange related to the real time control of the process.

According to another characteristic of the invention the architecture is constituted in a manner such that units are organized in one or more clusters around at least one industrial local area network of the site bus type which is specific to a cluster and which connects the units of the cluster to at least one shared unit, optionally serving as a gateway or as a router to another industrial local area network serving at least one other programmed unit of a higher level of the architecture, in

particular a supervision unit and/or optionally a unit serving as a gateway or router to an external communications network, so that the HTTP server of a cluster unit equipped with such a server responds with an optionally interactive computer document if a request is addressed to it, via at least one of the networks, by another unit or by a computer, in particular external to the system, equipped with an HTTP/TCP/IP protocol stack, when the request concerns inserting or extracting parameters and/or variables stored at the unit that includes said server.

The invention, its characteristics, and its advantages appear more clearly from the following description given with reference to the following list of figures, in which:

Figure 1 is a diagram summarizing the principle of a known communications architecture for an industrial system;

Figure 2 is a diagram summarizing the principle of a communications architecture of the invention; and

Figure 3 is a simplified diagram showing an example of a communications architecture of the invention for an industrial control system.

The prior art communications architecture that is shown in Figure 1 is organized to enable information to be interchanged between programmed operating units 1, 2, 3 of an industrial process control system made up of a plurality of monitoring/control devices, including, for example, site devices such as sensors 4 and actuators 5. These devices are controlled by programmed operating units represented in that example by units 2 that are assumed to deliver and/or receive information relating to the operations, in particular control and measurement operations, performed by the devices that they control. The operating units, such as the units 2, communicate as a function of needs firstly with the devices that they control, and secondly with other units of higher level,

such as 1 and 3, which are, in particular, assigned the task of supervising the industrial control system. The communications are set up via communications means 6 of the architecture, to which means the various units are connected more or less directly. As developed below, the communications means 6 are conventionally of the industrial local area network type.

Communications means 6' make it possible to connect the monitoring/control devices of the system to the operating units that control them, which communications means are optionally also of the industrial local area network type.

As indicated above, provision is made to implement time shared operation of the links in the communications means 6 and 6' so as to transmit information between the programmed operating units and between said units and the control devices, by enabling the information whose transmission is subjected only to constraints that are relatively flexible as regards urgency to make use of the lapses of time that are left available on a more or less regular basis by the information which is subject to more severe time constraints.

In order to make it possible to access information from outside the system, a server 7 of the HTTP type is provided in a unit of higher level, such as 1, which stores the information that is supplied to it by the other units and by the site devices in order to be able to insert it into HTML-format pages to which access is possible by means of a computer equipped to be able to access such pages. The computer (not shown) is, for example, connected to the unit 1 via a network 0 and for example via the Internet.

A user can thus access information, such as parameters or variables specific to the system, which are stored in the unit 1. The user may optionally supply information to the system, e.g. updating information, in

particular if the user has a computer equipped to be able to act as an HTTP server.

As indicated in the preamble of this Application, that solution is not fully satisfactory insofar as all of the information to be accessible in that way must be stored and updated at the unit 1, and insofar as it is possible for that information to be inexact, in particular when information characteristic of a change that has taken place at another unit or at a site device has not yet reached the unit 1 and when the HTML page in which it is to appear is supplied to a requesting user prior to updating. In addition, the use of the unit 1 as a storage intermediary that must be updated continuously induces an incessant information traffic which it is advantageous to avoid in networks that constitute the backbone of the communications means 6 and 6'.

The invention therefore proposes to modify the communications architecture of an industrial control system in the manner shown diagrammatically in Figure 2.

This architecture is designed to provide information interchange between programmed operating units of an industrial process control system that includes a plurality of monitoring/control devices 4, 4', 5 controlled as described above by units that are referenced 8 in this example and that differ from the units 2 by the means with which they communicate with the other units. At least some of the units, and optionally at least some of the monitoring/control devices, such as 4', include a server 9, of the HTTP type. In most cases, this server is relatively rudimentary insofar as, in particular, it does not generally need to include a specific data base for storing the information that it can receive and transmit, in particular when such data is already stored locally.

Such information is taken into account by the server 9 of the unit, which stores it, so that it can then be incorporated into transmitted computer documents that are

optionally interactive, e.g. into HTML pages. For example, the information may correspond to modifications in parameters or to changes in variables that are more or less complex.

Naturally, other programmed operating units of the system can be provided with a server 9, of the HTTP type, that is more or less elaborate depending on needs, as symbolized at a higher-level unit 10 which is represented in this example by two units 10 and 11.

The servers 9 have individual addresses of the Internet type which make it possible for a user to have access thereto by means of a suitably-programmed unit of the system or by means of a computer equipped with software and hardware suitable for being capable of behaving like an Internet customer. The customer unit or the computer acting as a customer is put in communication with a server of another unit and in particular a site unit via the set of communications means 6 included in the architecture and optionally via the Internet to which said set of communications means is then connected by a unit acting as a gateway.

To this end, the various programmed operating units of the industrial process control system that include HTTP servers are provided with communications couplers compatible with the HTTP/TCP/IP protocols and services in addition to the standard protocols and services of the local area network(s) used. They are thus capable of transmitting and receiving IP datagrams conveyed by said network(s), without disturbing the deterministic information interchange related to real-time process control.

Figure 3 shows a non-limiting example of an industrial process control system organized on the basis of a modular monitoring-control system for industry, e.g. the Applicant's ALSPA 8000 system. That system includes a plurality of programmed operating units, each of which is conventionally organized around at least one

processor, a set of read-only and or read/write memories, and auxiliary equipment such as, in particular, input/output couplers. Such a system incorporates three levels of operational functions corresponding successively to a process supervision and control level, to a process automation intermediate level, and to a process input/output level, in which levels various units are distributed.

The programmed operating units of the process supervision and control higher level are represented in this example by a process supervision and control operator platform 12, a supervision operator main station 13, a process computer 14, a unit 15 serving as a router or as a gateway for communicating with an external computer network 0, e.g. an Intranet or the Internet.

The programmed operating units of the process automation intermediate level are, in this example, represented by automatic controllers 17, 17', 17" which, in this example, are assumed to differ functionally, one being assumed, for example, to host sequential automation applications, another being a programmed power electronics controller, etc. The units may also be organized to be suitable for being used as gateways, which then perform protocol conversions, or as routers between local area networks 19, 19', or 19" and 20 included in the communications architecture.

The site programmed operating units situated at the interface with the process may be of various types. In this example, they are represented by input/output units 18 making it possible to put conventional sensors and/or actuators in communication with a suitable controller for controlling the level of automation of the process, by "intelligent" sensors and/or actuators 18', by units 18" for regulating and monitoring power conversion electrical equipment 18", by control units 18"' for controlling variable speed drive units, and by operator local stations 18"", etc.

It should naturally be understood that the units mentioned above are indicated merely by way of example, and that the above-indicated number of levels may optionally be reduced by grouping together functions of one level with functions of another level in operating units organized appropriately.

In the example considered, the communications architecture of the industrial process control system is assumed to be made up of deterministic industrial local area networks designed to accommodate both priority deterministic traffic for transmitting variables, and also event-based or "messaging" traffic. For example, the architecture may be based on implementing the standardized WORLDFIP network constituted by the Applicant's F8000 network.

Through the industrial local area networks, the operating units of the system are connected firstly to one another and optionally to the outside of the system, and secondly to various devices (not shown) in particular for monitoring/controlling the system, and to which certain units are physically connected by links L.

The operating units can be of a wide variety of types, both as regards their natures and their operating modes, and they are not developed herein insofar as they have only an indirect relation to the invention.

In the example considered with reference to Figure 3, provision is made for the site units 18, 18', 18", 18"', 18"" to be organized in one or more clusters around at least one individual cluster local area network such as 19, 19', or 19", generally referred to as a "site bus". In this example, the cluster network is connected to a programmed operating unit of intermediate level assumed, for example, to be constituted by a controller 17, 17', or 17".

Each of the intermediate units serves, in this example, as a gateway or as a router assigned to putting the cluster site units to which it is connected via one

of the cluster networks in communication with the higher-level units to which it is connected via a higher-level industrial local area network 20 commonly referred to as a "cell bus" or as a "control room bus".

The units are individually provided with HTTP servers, and have Internet-type addresses, the communications couplers that they include comply with the HTTP/TCP/IP protocols and services in addition to the standard services and protocols of the industrial local area networks used. The units are thus capable of transmitting and receiving IP datagrams which are, for example, encapsulated in messages conveyed in the context of standard messaging traffic, via the local area networks such as 19 and 20, without disturbing the deterministic traffic for interchanging variables that is conveyed via the networks. The datagrams may also be conveyed in the context of traffic replacing or adding to the standard messaging traffic, without disturbing the deterministic traffic. This thus makes it possible for at least one customer unit to address them so as to cause the information they store to be communicated to it so as to modify some of said information, without disturbing the real-time operation of the control system.

Such access takes place transparently via one of the intermediate units serving as a gateway for the site units of the same cluster. As indicated above, a user can access a server 9 of a unit, via a duly-programmed customer operating unit of the system and more particularly via a higher-level operating unit, through local area networks 19, 20, and through one of the intermediate units. The user can act from a customer unit constituted, for example, by an operator main station 13, or from a duly-equipped computer of the system or that communicates via the external computer network 0.

A server that receives a request from a unit acting as a customer responds with an optionally-interactive

computer document. The customer unit necessarily has an HTTP/TCP/IP protocol stack available so that it can firstly address its request and secondly take into account the information received in the form of a computer document from the server that it has addressed, the information being, for example, included in an HTML page. In particular, this makes it possible to insert or to extract parameters and/or variables, via a server 9, when said information is stored by the site unit that contains said server.

In the system considered herein, the local area network, such as 19, of a cluster of units conveys IP datagrams corresponding firstly to the customer/server requests coming from or via the shared unit, such as 17, to the servers of the units of the cluster, and secondly to the responses from said servers.

As is known, the use of the HTTP protocol makes it possible to reduce the time of use of the resources (process and socket) to a value that is very low because there is no session established between a customer unit and a server, and because the TCP/IP connection is interrupted, as soon as the customer unit has received the HTML document that it has requested of the server. The use of these resources by a customer unit thus always remains of very limited duration, which is particularly advantageous as regards how busy the transmission means included in a communications architecture of industrial facilities are. Naturally, the HTML pages produced at the level of a server of a site unit may contain hypertext links enabling a customer unit to go from one server to another in predetermined manner, if necessary.

CLAIMS

1/ A time-shared communications architecture for communicating digitized information for an industrial process control system, which architecture is organized around at least one industrial local area network (6) conveying deterministic traffic between various programmed operating units (11, 10, 8, 4'), which units process and store information which can be accessed by at least one other programmed operating unit (11, 10) via said architecture, said architecture being characterized in that it includes various programmed operating units (10, 8, 4') in particular comprising units situated at an intermediate level (8) or at a process interface level or at a site monitoring/control device level (4'), which units individually include servers (9) of the HTTP type so as to be capable of sending optionally interactive computer documents in response to requests received from another unit (11) of the system or from a computer, in particular external to the system, equipped with an HTTP/TCP/IP protocol stack and acting as a customer, in the context of messaging traffic making use of the transmission possibilities constituted by the time slots left available by the deterministic traffic of the industrial local area network(s) (6, 6') of the system, without disturbing the priority interchange related to the real time control of the process.

2/ An architecture according to claim 1, for an industrial process control system, in which programmed site units (18, 18', 18", 18"', 18"") are organized in one or more clusters around at least one industrial local area network (19) of the site bus type which is specific to a cluster and which connects the units of the cluster to at least one shared programmed unit (17), optionally serving as a gateway or as a router to another industrial local area network (20) serving at least one other programmed unit (14, 15) of a higher level of the

architecture, in particular a supervision unit and/or a unit serving as a gateway to an external communications network (0), so that the HTTP server of a cluster unit equipped with such a server responds with an optionally interactive computer document if a request is addressed to it, via at least one of the networks, by another unit or by a computer, in particular external to the system, equipped with an HTTP/TCP/IP protocol stack and acting as a customer, when the request concerns inserting or extracting parameters and/or variables stored at the unit that includes said server.

3/ A method of communicating information for an industrial process control system, in which method digitized information that is necessary to control the industrial process is interchanged in real time and in a manner internal to the system over at least one site network, in a deterministic mode, between at least one site device such as a sensor or an actuator, and at least one intermediate-level programmed operating unit or at least one higher-level programmed operating unit, said method being characterized by the fact that, in order to enable a user external to the system to access information stored in said site device or in said programmed operating units via an Internet or Intranet type network connected to one of the units, interchange is performed using the HTTP/TCP/IP protocol between the device in which said information is stored, which device may be a site device or an operating unit, and the intermediate-level or higher-level operating unit to which the Intranet or Internet network is connected, for available time slots provided over the site network by the deterministic interchange mode.

A B S T R A C T

COMMUNICATIONS ARCHITECTURE FOR AN INDUSTRIAL PROCESS CONTROL SYSTEM

A time-shared communications architecture for communicating digitized information for an industrial process control system, which architecture includes various programmed operating units (8, 10, 11) in particular site units (8) situated at a process interface level, which units process and store information which can be accessed by at least one other unit internal to the system or by an external computer, via at least one industrial local area network of said communications architecture. At least some of the units contain servers (9) of the HTTP type so as to be capable of sending optionally interactive computer documents in response to requests received from another unit of the system or from a computer, in particular external to the system, equipped with an HTTP/TCP/IP protocol stack and acting as a customer, without disturbing the priority and deterministic interchange related to the real time control of the process.

Translation of the title and the abstract as they were when originally filed by the Applicant. No account has been taken of any changes that may have been made subsequently by the PCT Authorities acting ex officio, e.g. under PCT Rules 37.2, 38.2, and/or 48.3.

FIG. 1

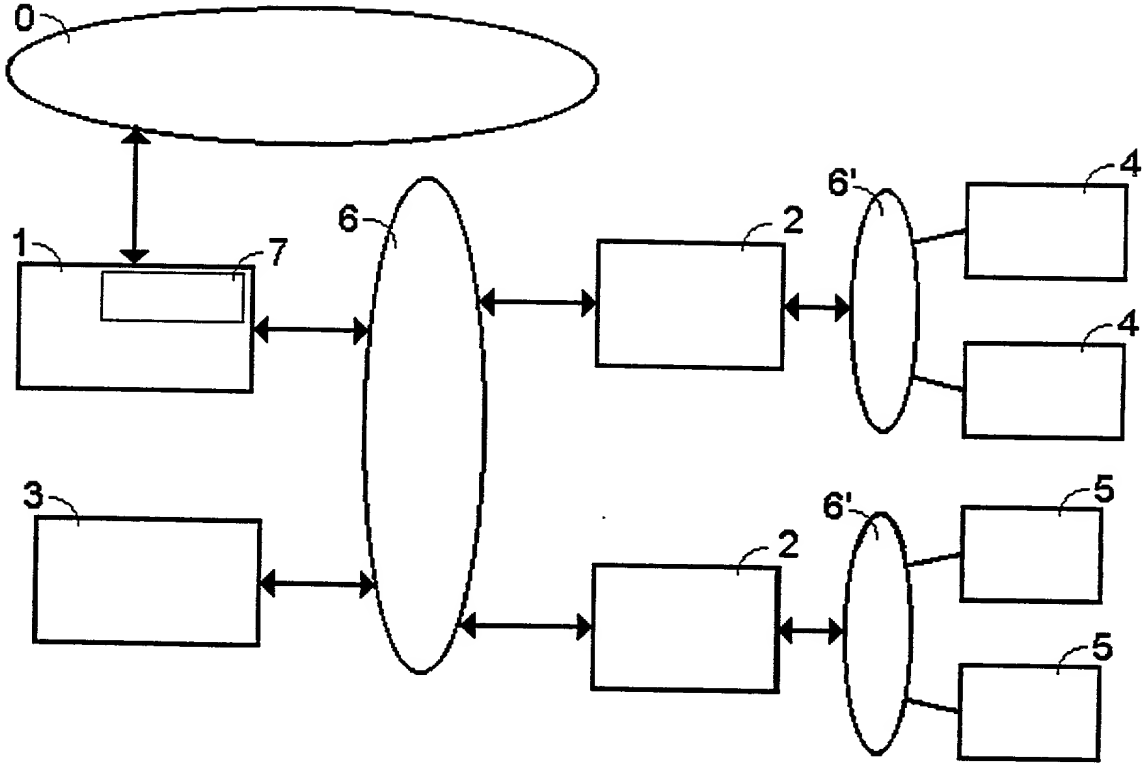
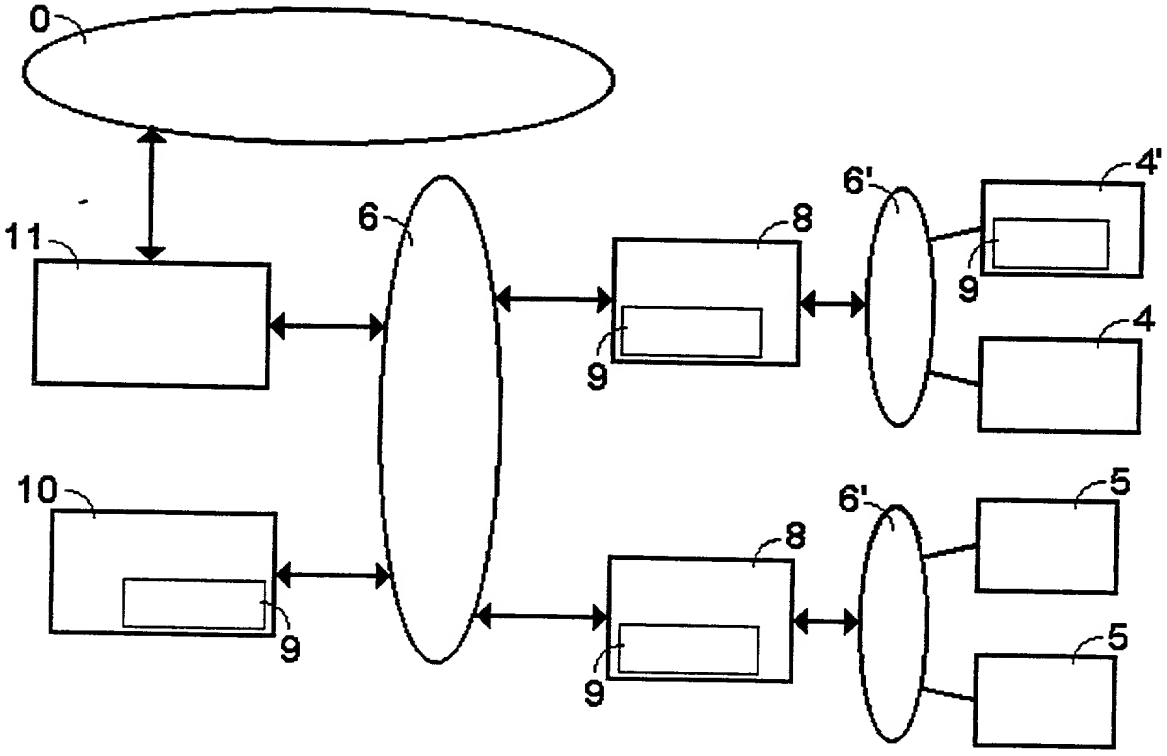


FIG. 2



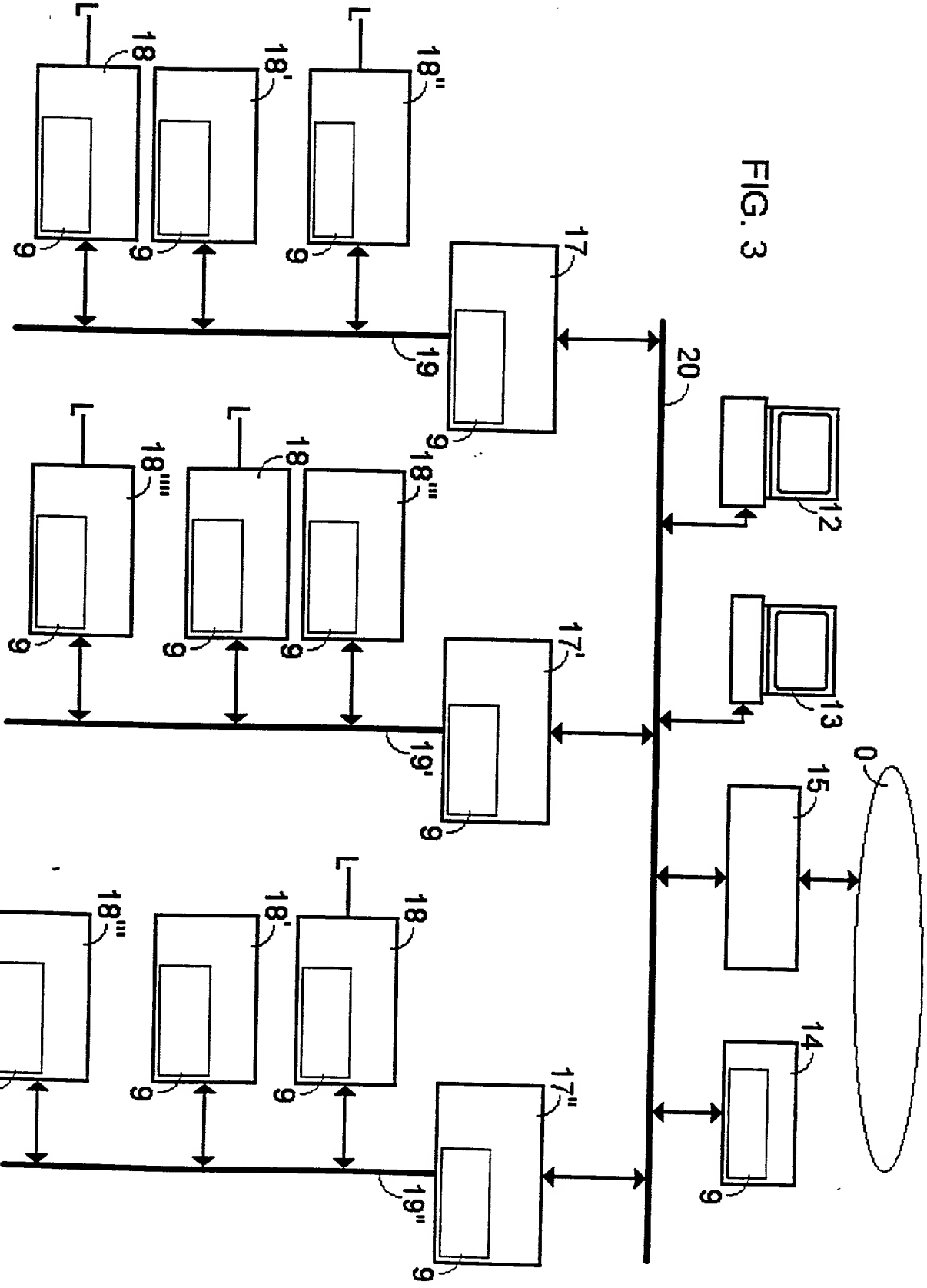


FIG. 3

Fº 101800

Declaration and Power of Attorney for Patent Application

USA

Déclaration et Pouvoirs pour Demande de Brevet

French Language Declaration

En tant que l'inventeur nommé ci-après, je déclare par le présent acte que:

As a below named inventor, I hereby declare that:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom.

My residence, post office address and citizenship are as stated next to my name.

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

COMMUNICATIONS ARCHITECTURE FOR AN INDUSTRIAL PROCESS CONTROL SYSTEM

et dont la description est fournie ci-joint à moins que la case suivante n'ait été cochée:

the specification of which is attached hereto unless the following box is checked:

☐ a été déposée le _____ sous le numéro de demande des Etats-Unis ou le numéro de demande international PCT _____ et modifiée le _____ (le cas échéant).

☐ was filed on July 21, 1999 as United States Application Number or PCT International Application Number PCT/FR 99/01797 and was amended on _____ (if applicable).

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises, telles que modifiées par toute modification dont il aura été fait référence ci-dessus.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

French Language Declaration

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35, § 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, en cochant la case, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet, tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée.

I hereby claim foreign priority under Title 35, United State Code, § 119(a)-(d) or § 365(b) of any foreign application(s) fo patent or inventor's certificate, or § 365(a) of any PC International application which designated at least one countr other than the United States, listed below, and have alsc identified below, by checking the box, any foreign application fo: patent or inventor's certificate, or PCT International applicatio: having a filing date before that of the application on whic: priority is claimed.

Prior foreign application(s)
Demande(s) de brevet antérieure(s)

Number (Numéro)	Country (Pays)	Day/Month/Year/Filed (Jour/Mois/Annee de depot)	Priority Not Claimed (Droit de priorite non revendique)
98 09 381	FRANCE	July 22, 1998	YES

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous.

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application No.) (N° de demande) _____ (Filing Date) (Date de dépôt) _____

(Application No.) (N° de demande) _____ (Filing Date) (Date de dépôt). _____

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont j'ai pu disposer entre la date de dépôt de la demande antérieure et la date de dépôt de la demande nationale ou internationale PCT de la présente demande:

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application No.) (N° de demande) _____ (Filing Date) (Date de dépôt) _____ (Status: patented, pending, abandoned) (Statut: breveté, en cours d'examen, abandonné) _____

(Application No.) (N° de demande) _____ (Filing Date) (Date de dépôt) _____ (Status: patented, pending, abandoned) (Statut: breveté, en cours d'examen, abandonné) _____

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

French Language Declaration

POUVOIRS: En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'ils poursuive(nt) la precédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec l'Office des brevets et des marques: *(mentionner le nom et le numéro d'enregistrement).*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*

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I hereby appoint John H. Mion, Reg. No. 18,879; Donald E. Zinn, Reg. No. 19,046; Thomas J. Macpeak, Reg. No. 19,292; Robert J. Seas, Jr., Reg. No. 21,092; Darrel Mexic, Reg. No. 23,063; Robert V. Sloan, Reg. No. 22,775; Peter D. Olexy, Reg. No. 24,513; J. Frank Osha, Reg. No. 24,625; Waddell A. Biggart, Reg. No. 24,861; Robert G. McMorrow, Reg. No. 19,093; Louis Gubernatis, Reg. No. 24,835; Neal B. Siegel, Reg. No. 25,200; David J. Cushing, Reg. No. 28,703; John R. Inge, Reg. No. 26,916; Joseph J. Rusz, Jr., Reg. No. 16,577; Sheridon J. Landsman, Reg. No. 25,430; Richard C. Turner, Reg. No. 29,710; Howard L. Bernstein, Reg. No. 25,665; Alan J. Kasper, Reg. No. 25,426; Kenneth J. Burchfiel, Reg. No. 31,333; Gordon Kit, Reg. No. 30,764; Susan J. Mack, Reg. No. 30,951; Frank L. Bernstein, Reg. No. 31,484; Mark Boland, Reg. No. 32,197; William H. Mauser, Reg. No. 32,156; Scott M. Daniels, Reg. No. 32,562; Brian W. Hannon, Reg. No. 32,778; Abraham J. Rosner, Reg. No. 33,276; Bruce E. Kramer, Reg. No. 33,725; Paul F. Neiss, Reg. No. 33,102; and Brent S. Sylvester, Reg. No. 32,765, my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and request that all correspondence about this application be addressed to SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC, 2100 Pennsylvania Avenue, N.W., Washington, D.C. 20037-3202.

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(Fournir les mêmes renseignements et la signature de tout co-inventeur supplémentaire.)

(Supply similar information and signature for third and subsequent joint inventors.)